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SUPPLEMENTAL INFORMATION
on
HIGH TEMPERATURE COATING AND
MATERIAL PROGRAMS AT
AMF

(NASA CR - - - ; AMF AR63-502A) OTS!

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AMF AR63-502A

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AMF

★ Supplementing the Report to the

NASA - ASD
REFRACTORY COMPOSITES WORKING GROUP
Palo Alto, California
March 11-14, 1963

by

M. E. Browning,

E. A. Schatz,

L. C. McCandless, and

E. G. Pearson

[1964] 6 p 0 reg ★

AMERICAN MACHINE & FOUNDRY COMPANY
ALEXANDRIA DIVISION
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HIGH TEMPERATURE, HIGH EMITTANCE COATINGS

17588/A

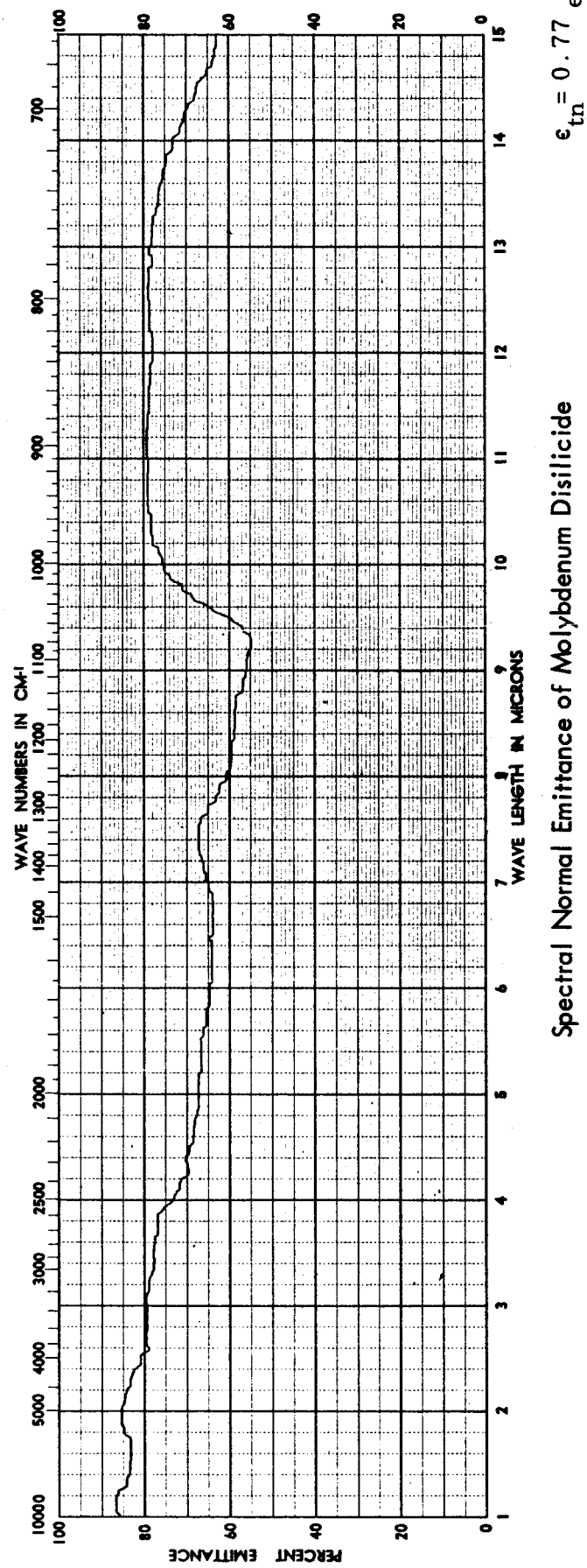
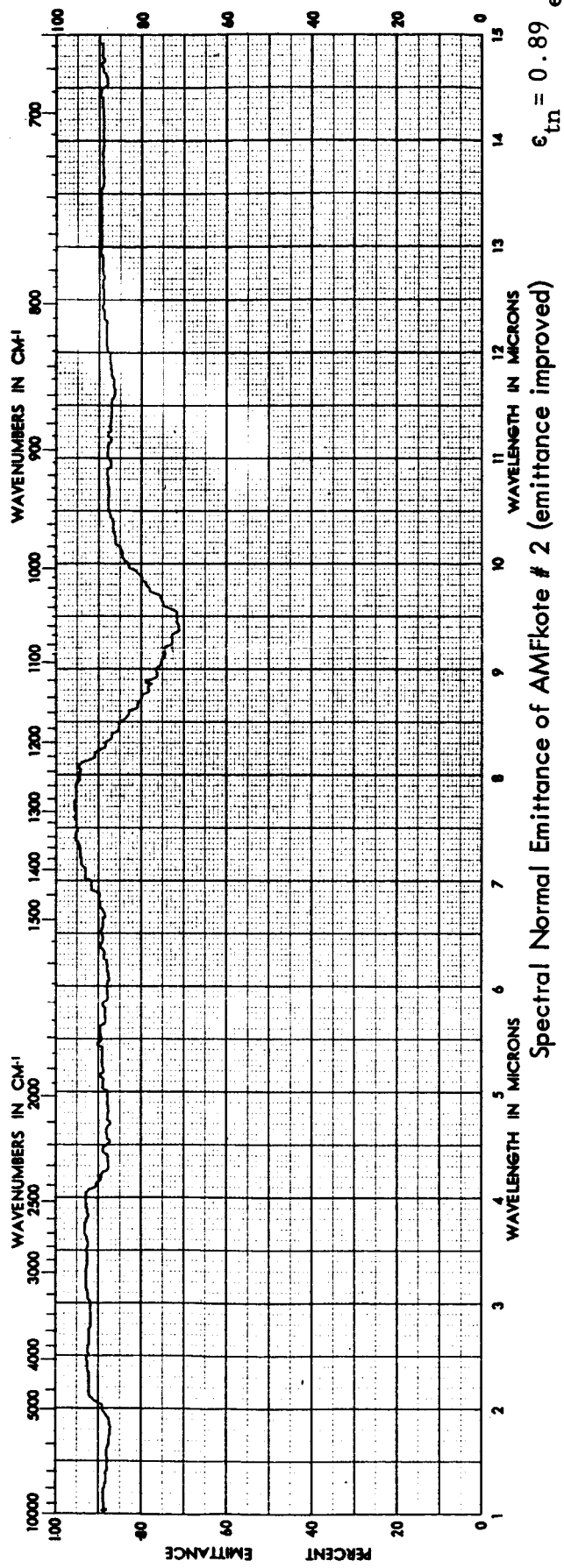
Oxidation resistant coatings capable of withstanding high temperatures and possessing high emittance properties are desirable from several standpoints (e.g. reducing re-entry heat damage to structural component properties). Work in the Coatings Section of the AMF Alexandria Materials Branch has been in part devoted to developing high temperature coatings with reliably high emittance characteristics. A summary of developments and conclusion in this area resultant of present work follows:

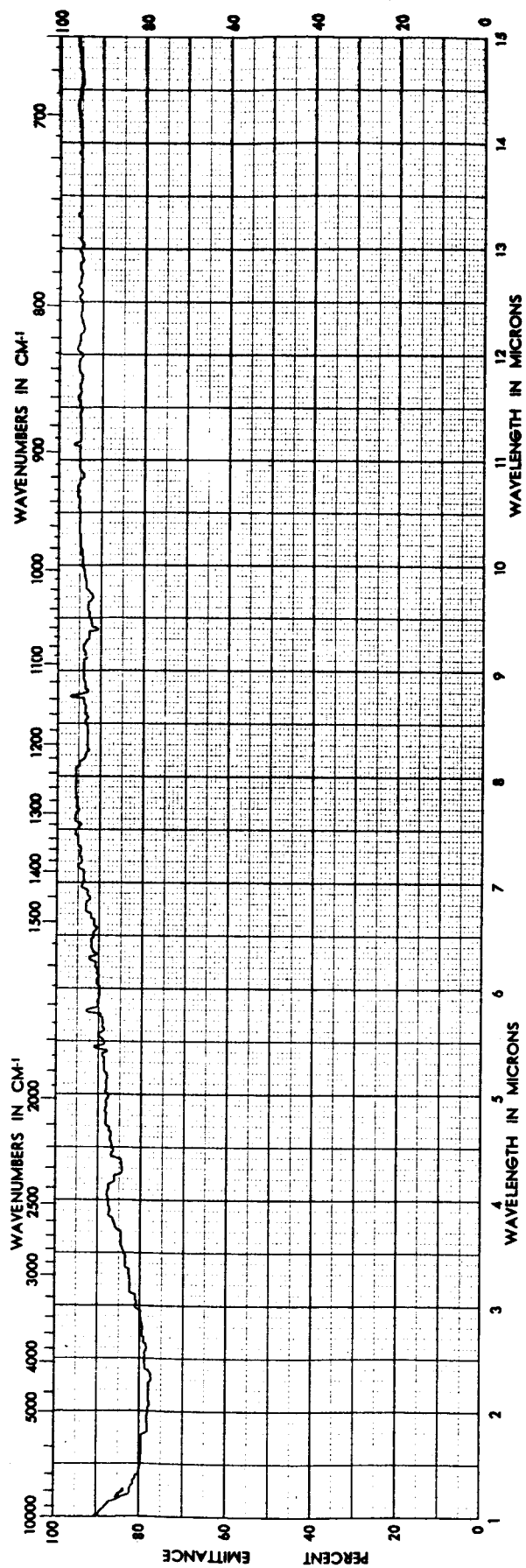
1. Conventional silicide, aluminide and beryllide coatings have been studied for emittance properties after various exposures. Borides, chromides and nitrides were also studied. Early indications are inconclusive, but using titanium systems the chromides and borides have total normal emittances above 0.8 while the silicides and aluminides are slightly below.
2. Presently available coatings may, in some cases, be improved emittance-wise without deleterious effect to overall protectiveness. AMFkote #2 can be emittance improved to display a total normal emittance near 0.9 at temperatures above 1000°C.
3. Thin skin structures may be protected by high emittance coatings representing families of materials not commonly used for high temperatures protective coatings.

The emittance properties of several developmental AMF coatings are compared to molybdenum disilicide in the following curves. In each case the coating was formulated with emittance improvers, attempting to also maintain optimum protectiveness.

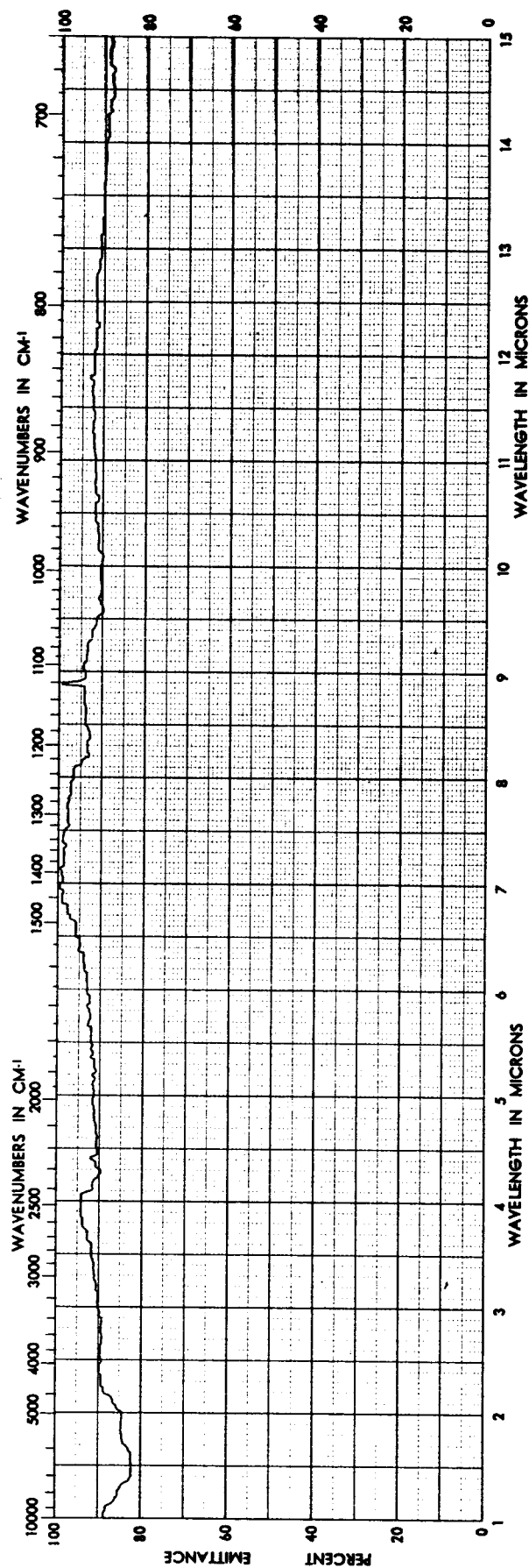
Author

Coatings have been exposed to a variety of environmental conditions and tested in air. It has been found that emittance determinations at 1000°C very nearly characterize the emittance values at much higher temperatures. Since these changes were very small all tests were performed at 1000°C in a Baird-Atomic double-beam ratio recording infrared spectrophotometer modified for external entrance optics.





Spectral Normal Emittance of AMF Coating for Tantalum $\epsilon_{tn}=0.86$ est.



Spectral Normal Emittance of AMF Coating for Columbium (Emittance Improved Series)

$$\epsilon_{tn} = 0.91 \text{ est.}$$